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ABSTRACT

It is proposed that in studying the development of children's speech, the findings in the data are heavily influenced by what is expected to be found on the basis of our theoretical preconceptions. This phenomenon is actually more widespread than has previously been acknowledged, and our expectations about how children learn language may have to be revised. The assumptions commonly made are: (1) children's speech can be analyzed using adult categories; (2) language development follows an orderly progression of stages; (3) all children's language development is similar; (4) the intelligibility of the child is an external criterion; and (5) the unintelligible utterances play little part in the intelligible speech of a child. Speech of the subject in this study was analyzed from age 7 months to 2 years and 3 months. The boy's speech was divided into two categories: (1) analytic, which deals with simple words; and (2) Gestalt, which aims at whole phrases and sentences. It is proposed that the Gestalt strategy of early language production is much more widespread than just this case reports, because children's sentences are often not understood as such. In addition to cognitive and sociolinguistic factors that affect a child's language learning, there may be a neurological factor related to the differentiation of the cerebral hemispheres and the eventual lateralization of language. This suggests that the subject's Gestalt strategy of language production may be related to the development of his minor hemisphere while his analytic strategy is related to major hemisphere development. (NCR)

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LANGUAGE LEARNING STRATEGIES: DOES THE WHOLE EQUAL THE SUM OF THE PARTS?*

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1. Introduction. Assumptions about language learning strategies.

In studying the development of children's speech, what we find in our data is heavily influenced by what we expect to find on the basis of our theoretical preconceptions. In fact, how we handle the data of children's speech typically reflects the techniques we have already developed for handling linguistic data in general, particularly normal adult speech. Inevitably, however, there is a class of phenomena that do not fit our expectations, our descriptive techniques, or our theoretical constructs. I will call this "residue class".

In my research on the language acquisition of one child I have come across a situation in which the residue class actually outweighs the central core of regular analyzable data. I propose to show that this phenomenon is actually more widespread than has heretofore been acknowledged, and that we may have to revise our expectations about how children learn language.

First let me enumerate some of the assumptions that we have, sometimes tacitly, been making. (1) We have assumed that the child's speech can be analyzed using adult categories. Thus we look for distinctive features, phonemes, morphemes, words, immediate constituents, and so on. (2) We have expected language development to follow an orderly progression of stages from most simple to most complex. For example, in phonology Jakobson (1968 [1941]) suggested that the child first learns one distinctive feature, then a second, and so on. In syntax it is assumed that the child first produces one-word utterances, then two-word utterances, and so on; developmental stages that have been observed in some children include Brown's stages based on utterance length (Brown, 1973) and Scollon's vertical followed by horizontal constructions (Scollon, in press). Implicit in this assumption is another assumption about what is "simple". For instance, a one-word utterance is considered "simpler" than a two-word utterance. (3) We have also assumed that language development follows essentially the same course in all children, and that therefore we need only to look at a small number of children to find out what happens in all. It follows from this assumption that one may choose one's subjects on external criteria of convenience, for example those closest to

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The third major contributor to limited output variety, in a passive way, is slective avoidance. By avoiding words that do not match his output capabilities, the child keeps his output repertoire small without the use of rules.

There are thus three distinguishable ways that we know of in which beginning speakers deal with the problems of saying words,[2] and in one way or another each of them leads to the surface appearance of an output dominated by canonical forms.

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[2]Farwell's paper in this volume presents a fourth strategy. Not only is there avoidance of difficult sounds, but also an exploitation of well-mastered sounds. One might consider these two strategies related and range them along a scale from active (exploitation) to passive (avoidance), but the case of exploitation (use of 'favorite sounds') which Farwell presents is different enough from the cases of avoidance which we have mentioned that I would like to revise my original statement and to say now that there are four ways in which children arrive at the canonical-form-dominated output.

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home (children of linguists or their colleagues), or those who are most voluble (to minimize data collecting time). (4) We have further assumed that the intelligibility of the child is one such "external" criterion. That is, we need study only the more intelligible subjects--the "unintelligible" children are basically the same but harder to work with. A consequence of this assumption is that most children that have been studied were either deliberately chosen for intelligibility (Brown, 1975, p. 51) or happened to be highly intelligible due to other circumstances. Certainly, linguists have made little or no effort to search out the more "unintelligible" children for study. (5) Finally, a related assumption linguists have made is that even in the speech of generally intelligible children the unintelligible utterances play little, or at least no direct, part in the process of language acquisition and can be safely ignored in the study of this process.

I was led to examine these assumptions through struggling with data I collected from what I will call an "unintelligible" child--a child who by age 3 seems to be talking normally, but who, during his second year produced an extremely high proportion of utterances which I found unintelligible.[1] When I finally readjusted my preconceptions of what he was doing I began to make sense of many previously unintelligible utterances.

In making this readjustment I had to confront the problem of how we decide what is "only babbling" and what is "real speech". We tend to class an utterance as "real" if we feel that it was intended. But since we often cannot tell what the child intended we fall back on what we think the child is capable of producing, that is, on whether the utterance falls within an appropriate simplicity range. And here is where our unexamined assumptions about what is "simple" get in the way: while it may be reasonable to suppose that a child begins with simple utterances and builds up to more complex ones, this does not necessarily mean beginning with short clear utterances and building up to long clear ones. It might also include beginning with longish utterances which are only sketchily approximated and progressively filling in the details.

2. A child with a different strategy.

The subject of my study, whom I shall call Minh, is the second of two children, both boys, of a family in which the mother has attended college and the father has a graduate degree. The mother, a Vietnamese, came to the U.S. when she was twelve years old. During the time of the study she spoke little Vietnamese to the boys although they often heard her using it with friends and relatives. The father is Caucasian and was born in the mainland U.S. The family has many local friends and the boys were thus exposed primarily to Standard English, secondarily to Hawaiian English[2] and Vietnamese.

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[1] My impression is that his family understood Minh considerably better than I did, though how much better I will never know since at the time I did not make it a point to ask them systematically for interpretation of speech that I could not understand. My evidence for believing that they did, in fact, understand him fairly well, although not perfectly, comes from those situations in which his mother either spontaneously interpreted his speech for me or responded to his speech, which had seemed unintelligible to me, in such a way as to throw light on its possible meaning.

[2] (Next page)

I began my study when Minh was 7 months old, recording him on a fairly regular basis until he was 2 years and 3 months old. The first "speech" I recorded from him that did not appear to be babbling was imitations of adult speech which first occurred at 7-1/2 months. When Minh was 11 to 12 months old I found not only imitated and modelled[3] speech, but also a few spontaneous utterances that sounded like appropriate words for the context in which they occurred but which I was reluctant to judge as intentional because of their surprising complexity as well as their lack of recurrence. Examples of spontaneous utterances include:

[rɪkɔdæ]	'recorder'	
[kʰa]	'car'	
[tʰyɪk·ho]	'tickle'.	[1;0.7]

When Minh was about 14 months old he began to acquire a reliable repertoire of regularly recurring "simple words" such as

‹ha›[4]	'hot'
‹gayi›	'doggie'
‹gugu›	'cookie; eat'
‹dædi›	'daddy'
‹titi›	'to nurse; baby'.

Gradually I realized that Minh was actually producing at least two distinct kinds of speech. The first kind, the kind I expected to find, was the nice, neat one-word utterance which began occurring in my data when Minh was about 14 months old. These early words were all one or two syllables long and slowly increased both in number and closeness to the adult target. I will call this first kind of speech Analytic.

Although I did not realize it at the time, the second type of speech began to appear even earlier than Analytic speech. A special early case of this I have called "learning the tune before the words" (Peters, 1974). In this case each target phrase has a very characteristic intonation contour. For example, each of the following phrases has a "melody" unique enough to allow it to be recognized even if it is rather badly mumbled:

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[2] Hawaiian English includes several varieties of English, all of which differ phonologically from Standard English, and which differ in varying degrees syntactically and lexically from Standard English. The variety to which Minh is exposed is the variety which is syntactically closest to Standard English.

[3] By "modelled" speech I mean speech that <u>may</u> have been imitated because a model for the utterance was present in the speech environment during the preceding few minutes. For a fuller discussion of modelled vs. imitated vs. spontaneous speech see Scollon (in press).

[4] Since Minh's pronunciation varied rather widely I am using angle brackets to indicate a "reconstructed" underlying target form (an abstracted impressionistic average). For example, at around 14 months I find the following pronunciations of <u>cookie</u> (‹gugu›): [kʰuku, gɨgi, gʊgu, dɪdɪ, kʰugu, kuki, kuki, gugi, gɨgi].

uh oh! [¯ _]

look at that! [_ _ ↘]

oopsidaisy! [¯¯ _ _]

Mommy! [¯ _]

what's that? [_ ↘]

Minh regularly approximated each of these phrases by their tunes by the time he was 14 months old, having started as early as 11 months. These early tunes were fairly easy to recognize because they were all used quite frequently in speech to Minh, and because he used them so appropriately.

He apparently attempted to extend this strategy of extracting the melody at the expense of the individual segments to those cases where the target sentence was <u>not</u> so reliably characterized by its intonation contour, and hence was not recognizable except in very context-bound situations. The result was utterances in which, although the segmental fidelity was not very great, the combination of number of syllables, stress, intonation, and such segments as could be distinguished combined to give a very good impression of sentencehood. I will call this type of speech Gestalt since like the tunes, which it includes, it seems to be aiming at whole phrases or sentences rather than at single words. For instance, at 14 months, when he seemed to control only 6 to 10 words Analytically he quite clearly said <u>open the door</u>! four times in succession:

ˈɔbɛ dʌ tʻʊːʰ
[¯ ¯ ¯ /]

ˈobɛ dʌ dɛ́
[_ ¯ ¯ _]ʰ

ˈobɛ ðʌ deːⁱʰ
[¯ ¯ ¯ /]

ˈʌbɛ dʌ dˆdɛ
[¯ ¯ ¯ _ ↘]

Since he was pounding on the bathroom door and shouting to his brother on the inside it was quite clear what his target sentence was even though he had not shown evidence of controlling any of the constituent words.

Some of Minh's early tunes incorporated both fairly well analyzed parts and "filler syllables" which seemed to be used as place holders to fill out not yet analyzed parts of a phrase. Thus, between 14 and 15 months Minh would exclaim when something fell on the floor:

‹ˈo ˈo, dʌ dʌ dʌ› 'uh oh, x x x'.

Or, one day he called for his mother:

maˑni, dæ dæ lʌ
[¯ _ ¯ ¯ _]

mani, dæ dʌgni 'Mommy, x x x'
[¯ _ ¯ ¯ _]

mani, dʌdʌbyʌk
[¯ / ¯ ¯ ¯]

[1;4.0]

These utterances were presumably aimed at targets heard from adults or his big brother in which one part was relatively fixed (e.g. uh oh! or Mommy!) but in which the other part tended to vary depending on the particular situation (e.g. uh oh, fell down!, uh oh, what happened? or Mommy, I want you! Mommy, come help me!). The fixed parts were reproduced faithfully while the variable parts seemed to be less well analyzed and were represented by place holders like ‹dʌdʌ› and ‹dʌdʌdʌ›.

By 17 months he began putting another type of filler syllable in front of many of his one word utterances. This syllable took various shapes, ranging over [nʌ], [ə̃], [m̩], [hɪ], though it usually seemed to be of the form [ŋ] or [ɪŋ]. It seemed to mean something like 'here', 'there', 'this', or 'where'. Thus,

ɪŋ dæ dɪʰ [˨ ˗ ˗]	'where(?) daddy?'
ebibi [˗ ˗˨]	'that(?) baby.'
mbebɪʰ [˨˗ ˗]	'that(?) baby.' [1;5.0]

There was always a large proportion of Minh's speech which I was unable to understand. Week after week I would return from recording with the frustrated feeling that I was missing most of what he said. It sounded so much like it should mean something and yet I rarely understood a thing unless he happened to be naming pictures in a book. Sometimes his mother would come in, realizing that I was not understanding, and interpret for me, which helped, especially when I played the tape back at home. Sometimes while transcribing I would suddenly understand an utterance that I had entirely missed when he had originally said it and so had failed to respond appropriately. I began to wonder if Minh felt frustrated when his speech was so often not understood.

In working through some of my tapes again I gradually began to realize that perhaps I had missed so much of what Minh said because it was in an unexpected form. Perhaps I had expected approximations to words and he had given me approximations to sentences. Sure enough, in relistening with a new set of expectations I found many more understandable utterances than previously[5]--on one tape about five times as many, including such remarks as

[illegible] lər ri gʊ mu nyai. [˗ ˗ ˗ ˉ ˗ ˍ]	'I like read Good Moon Night.' [= Goodnight Moon]
sɪli, ɪnɪ? [ˉ ˍ ˉ ˍ]	'Silly, isn't it?' [1;7.2]

[5] Scollon has also discussed the phenomenon of an investigator gradually being able to "stretch his understanding" to include previously unintelligible utterances. See Scollon (1974) and Scollon (in press), especially the section on intelligibility.

I had failed to interpret these utterances at first because I was not expecting utterances of such length and complexity and because the context did not make the meaning so obvious as in the open the door! example.

A further characteristic of Minh's two kinds of speech, the Analytic and the Gestalt, is that they were often correlated with a social setting. Analytic (one-word-at-a-time speech) was generally used in a referential context: naming a picture, a quality or a desired object or action, while Gestalt speech was used more conversationally: playing with his brother or discussing objects sociably (rather than naming them). Thus, if he was merely naming pictures in a book he tended to use one-word utterances, while at other times he seemed to be trying to reproduce the gestalt of an adult reading aloud to him, in which case his utterance length would increase and intonational features would become very prominent. An early example of this occurred when Minh was 16-1/2 months old and he was looking at a photograph album with pictures of his family (Mommy, Daddy, Baby, and Mema the grandma). Typical remarks include:

ɛm	bébi	dyɛm	bébi	
[–	¯ _	–	– ¯	]
where	baby	x	baby?	

máni	ma	máni	
[¯ _	–	– ¯	]
mommy	where(?)	mommy?	

hɪ	dæ	di	dæ	dɛʰ	
[¯	_	_	–	–	]
where(?)	daddy		daddy?		[1;4.21]

Two weeks later, again looking at the photo album, he said:

ŋ	hŋ	dʌnɪ	mɪmɪ	bibm̩	dæ	di		
[¯	¯	– –	– –	– –	¯	_	]	
there	is	?	mema	baby	daddy.	(?)		[1;5.0]

Not only did Minh try to approximate such adult linguistic activities as reading aloud, he also made very creditable attempts at sounding like he was counting, reciting the ABC's and singing songs. Minh has always been a musical child. He loves to listen to music, to dance to it, and to try to produce it himself, either by singing or by playing on various instruments that came within his reach.

3. Other evidence for gestalt language.

I propose that a gestalt strategy of early language production is much more widespread than just the case reported. In discussions of children's babbling, of course, it is a commonplace that children seem to pick up and produce intonational patterns before they control other aspects of speech. For instance, Engel (1973 [1964]) found the equivalent of Minh's tunes in her son's early speech. She observes that "the melodic factors appeared before the articulatory ones" (p. 10) and that even with a difficult word the stress and pitch were always right (p. 11).

Minh's use of the preposed syllable ‹ŋ› is similar to the schwa element found by Bloom (1970) in the early constructions of all three children she investigated. For instance she describes Kathryn's /ə/ (at 21 months) as "a grammatical place holder" in utterances such as "ə try", "ə see ball", "Lois ə coming" (pp. 74-75). The use of stereotyped syllables, such as ‹ə›, ‹ŋ› or ‹dʌ›, to fill out the gestalt of a target utterance may actually be rather widespread but may have received inadequate attention because our theories have ignored holistic approaches to language acquisition and production.

Bloom also reports that a fairly high proportion of Eric's speech was "unintelligible" at sampling times I (p. 105) and II (p. 106). She describes him as producing

> extended strings of sounds with recognizable English sentence intonation patterns--but containing few intelligible words, if any...Eric's unintelligible production...appeared to represent an attempt at imitating the superficial, acoustic aspects of heard speech. (p. 102)

In her monograph Structure and Strategy in Learning to Talk (1973), Katherine Nelson proposes a model for learning to talk which includes as a major component the child's conception of the primary purpose of language. Ten of the eighteen children she studied seemed to use language primarily to name things; these children she termed Referential. The other eight children used language more to express feelings, needs and social forms; these children are termed Expressive (pp. 21-22). In a more recent paper (Nelson, 1975), she states that the Expressive speakers:

> learned and used a large number of phrases and sentences early in the language acquisition period, while the ... Referential [speakers] did not--they could be described as progressing clearly from a one-word to a two-word stage whereas the Expressive speakers could not be so characterized. (p. 462)

In looking through Nelson's sketches of language learning histories for four of the Expressive speakers (Nelson, 1973) we find that they all used phrases as well as single words.

Krashen (1975) has recently discussed a dichotomy in adult second language learning similar to the Gestalt/Analytic or Expressive/Referential in children. It would be interesting to see if a child's preference for one strategy over the other persists into adulthood.

4. Possible developmental neurolinguistic implications.

The terms Analytic and Gestalt were suggested by recent work in neurolinguistics which shows that different parts of the brain process input in correspondingly different ways. I would like to propose that in addition to Nelson's cognitive and sociolinguistic factors which affect a child's progress in language learning, there may be a neurological factor which relates to the differentiation of the cerebral hemispheres and the eventual lateralization of language.

Although there is little data yet on language processing at the neurological level in young children,[6] there is a growing body of evidence about neurological specialization for both linguistic and nonlinguistic functions in adults. The language-dominant hemisphere[7] seems to be the locus for many kinds of analytic and temporal processing, while the minor hemisphere seems to specialize in gestalt processes such as spatial orientation and pattern recognition. Dichotic listening tests show a right ear (left hemisphere[8]) superiority for perception of consonant-vowel syllables (Studdert-Kennedy & Shankweiler, 1970), function words (Curry & Rutherford, 1967), nouns (Borkowsky, Spreen & Stutz, 1965), and sentences (Zurif & Sait, 1970), and a left ear (right hemisphere) superiority for melodies (Kimura, 1964), chords (Gordon, 1970), environmental sounds (Curry, 1967), and filtered intonation contours of sentences (Blumstein & Cooper, 1973). (For a thorough review of this literature see Van Lanker, 1975). Finally there is evidence from aphasics and hemispherectomy patients that production of intonational contours and so-called "automatic speech" does not take place in the same part of the brain as other aspects of speech production (whether in the minor hemisphere or in another part of the major hemisphere has not yet been determined) (Van Lanker, 1975; Zaidel, 1975).

The evidence for the separation of Gestalt and Analytic processing of linguistic material, coupled with my observations of Minh's love of music (singing and piano playing), suggests that his Gestalt strategy of language production is perhaps related to the development of his minor hemisphere while his Analytic strategy is related to major hemisphere development. The fact that this is so speculative points up our need for further research in developmental neurolinguistics.

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6 A few articles on developmental neurolinguistics are just beginning to appear in the literature, but they have hardly begun to scratch the surface. See, for instance, the articles by Jacobson, Lecours, and Zangwill in the new volume edited by the Lennebergs (1975).

7 In most right handed people and in many left handed people the language dominant, or major hemisphere is the left hemisphere. For these people, then, the minor hemisphere is the right hemisphere. For all other people language is in the right (major) hemisphere and the left hemisphere is the minor one.

8 Although nerve fibers from either ear are connected to both hemispheres, the crossed (contralateral) pathway seems to be stronger than the uncrossed (ipsilateral) pathway. Thus the right ear is more strongly connected to the left hemisphere (which is dominant in most people) and the left ear is more strongly connected to the right (minor) hemisphere.

5. Conclusion.

The research just summarized, together with my own investigation, point, I believe to four areas in which further work is needed. First, we need to modify our expectations about the nature of early language and accept the Gestalt speech production strategy as something "real" and worthy of investigation along with the Analytic. Second, we need to develop theories, both of language processing in general as well as of language development to account for the existence of two such diverse strategies. Third, we should look for evidence of Gestalt speech in both the existing literature and in new studies. The babbling of children who are already beginning to produce their first Analytic words should prove a very promising area to investigate. Finally we need to extend neurolinguistic research to children in order to determine whether the occurrence of Gestalt and Analytic speech is correlated with language lateralization and other areas of neurological development.

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